

CLAIMS

1. A clutch control apparatus for a hybrid vehicle having an engine and a motor as power sources, and an output shaft to which at least one of the driving powers of the engine and the motor is transmitted for driving the vehicle in an engine cruise mode in which the vehicle is driven by the engine, or in a motor cruise mode in which the vehicle is driven by the motor, the clutch control apparatus comprising:

a clutch device which is provided between the engine and motor and the output shaft, and which is adapted to selectively disconnect the driving powers of the engine and motor from the output shaft; and

a clutch control device operatively connected to the clutch device for controlling the engagement degree of the clutch device when the driving mode of the vehicle is alternately switched between the engine cruise mode and the motor cruise mode,

wherein the clutch control device is adapted to execute a clutch relaxation control operation when the driving mode of the vehicle is switched between the engine cruise mode and the motor cruise mode, which includes an engagement decreasing control operation in which the engagement degree of the clutch device is decreased, and a subsequent engagement recovery control operation in which the engagement degree of the clutch device is gradually increased and recovered, and is further adapted to execute an engagement increasing control operation in which the engagement degree of the clutch device is forced to increase when the revolution rate of the engine falls below a predetermined value.

2. A clutch control apparatus according to claim 1, wherein the engagement

increasing control operation, which is executed with reference to the predetermined value

of the revolution rate of the engine, is executed within a predetermined period that begins at the beginning of the clutch relaxation control operation, and the engagement recovery control operation is executed after the predetermined period has passed.

5 3. A clutch control apparatus according to claim 2, wherein the engagement recovery control operation and the engagement increasing control operation are executed stepwise.

10 4. A clutch control apparatus according to claim 3, wherein an increment of increase in the engagement increasing control operation, which is executed with reference to the predetermined value of the revolution rate of the engine, is set to be less than that in the engagement recovery control operation.

15 5. A clutch control apparatus according to claim 1, wherein the engine is adapted to perform a fuel supply operation and a fuel cut operation which is switched to the fuel supply operation at a fuel cut operation canceling revolution rate, and the predetermined value of the revolution rate of the engine is set depending on the fuel cut operation canceling revolution rate.

20 6. A clutch control apparatus according to claim 1, wherein the hybrid vehicle comprises an automatic transmission, and the clutch device is a starting clutch provided for the automatic transmission.

25 7. A clutch control apparatus for a hybrid vehicle having an engine and a motor as power sources, and an output shaft to which at least one of the driving powers of the

engine and the motor is transmitted for driving the vehicle in an engine cruise mode in which the vehicle is driven by the engine, or in a motor cruise mode in which the vehicle is driven by the motor, the clutch control apparatus comprising:

5 a clutch device which is provided between the engine and motor and the output shaft, and which is adapted to selectively disconnect the driving powers of the engine and motor from the output shaft; and

a clutch control device operatively connected to the clutch device for controlling the engagement degree of the clutch device when the driving mode of the vehicle is alternately switched between the engine cruise mode and the motor cruise mode,

10 wherein the clutch control device is adapted to execute a clutch relaxation control operation when the driving mode of the vehicle is switched between the engine cruise mode and the motor cruise mode, which includes an engagement decreasing control operation in which the engagement degree of the clutch device is decreased, and a subsequent engagement recovery control operation in which the engagement degree of
15 the clutch device is gradually increased and recovered, and is further adapted to control the engagement degree of the clutch device depending on the revolution rate of the engine.

8. A clutch control apparatus according to claim 7, wherein the control operation
20 for the engagement degree of the clutch device, which is executed depending on the revolution rate of the engine, is executed within a predetermined period that begins at the beginning of the clutch relaxation control operation, and the engagement recovery control operation is executed after the predetermined period has passed.

25 9. A clutch control apparatus according to claim 7, wherein the engagement degree

of the clutch device is changed in accordance with a clutch oil pressure correction coefficient which is determined in advance depending on the revolution rate of the engine.

5 10. A clutch control apparatus according to claim 9, wherein the clutch oil pressure correction coefficient is set higher so as to increase the engagement degree of the clutch device as the revolution rate of the engine decreases.

11. A clutch control apparatus according to claim 7, wherein the hybrid vehicle
10 comprises an automatic transmission, and the clutch device is a starting clutch provided for the automatic transmission.